- 1. An automated manufacturing method, comprising the steps of:
- 2 receiving a description of an object to be fabricated having a desired geometry;

identifying regions in which at least one automated material addition process and

- 4 at least one automated material subtraction process should occur to fabricate the object in accordance with the description;
- 6 generating toolpaths associated with the material addition and subtraction processes; and
- 8 fabricating the object in accordance with the toolpaths.
- 2. The method of claim 1, wherein the regions are layers, volumes, lines or voxels.
- The method of claim 1, wherein the automated material subtraction
 process includes milling or the use of lasers, knives, hot wires, arc cutters, or plasmas cutters.
- 4. The method of claim 1, wherein the automated material addition process includes solid-state or fusion welding, laser material deposition, metal spraying, or adhesive bonding.
 - 5. The method of claim 1, wherein:
- the automated material addition process includes welding; and calculating weld pressure, temperature, excitation amplitude or frequency to fabricate the object in accordance with the description.
- 6. The method of claim 1, wherein the subtractive process does not require
 the use of work holding fixtures or fiducial marking.
 - 7. The method of claim 1, further including the step of soft fixturing multiple

- 2 parts.
- 8. The method of claim 1, wherein:
- the automated material addition process includes ultrasonic consolidation; and calculating consolidation pressure, temperature, excitation amplitude or frequency
- 4 to fabricate the object in accordance with the description.
- 9. The method of claim 1, further including the step of blending the regions
 2 to eliminate seams that would be generated due to the subtractive process used.
- 10. The method of claim 1, further including the step of creating enclosed and overhanging features using the additive or subtractive manufacturing processes, or a combination thereof.
- 11. The method of claim 1, further including the steps of:
 2 identifying changes in the desired geometry;
 removing excess material to achieve the desired geometry.
 - 12. The method of claim 1, further including the steps of:
- analyzing the description of the object to be fabricated to recognize the tool size, heated wire or laser beam size required to fabricate the object in accordance with the description.
- 13. The method of claim 1, further including the step of using a slab generation technique without the use of a tessellated model.
- 14. The method of claim 1, further including the step of fabricating the object
 vertically or horizontally in accordance with the description.

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- The method of claim 1, further including the step of generating enclosedcavities within the object during the fabrication thereof.
- 16. The method of claim 1, further including the step of calculating undercuttool paths without tool or object reorientation.
- 17. The method of claim 1, further including the step of repairing an existing2 mold or other object.
- 18. The method of claim 1, wherein a tool path associated with additive processing is based on the nature of the additive process used.
- 19. The method of claim 1, further including the step of incorporating
 2 negative draft angles using the additive or subtractive processing.
 - 20. The method of claim 1, further including the steps of:
 - generating finish paths that are dependent on the flute height of the smallest tool required; and
- determining what Z height should be deposited and trimmed prior to finishing based on the flute height of the smallest tool required.
 - 21. The method of claim 1, wherein:
- certain features are deposited with excess stock based on feature geometry; and
 removing material to enhance the deposition process, or speed the build rate of the
 object.
- 22. The method of claim 1, further including the step of generating a conformal support material containment structure.